

sums needed in addition to all the resources the colleges at present possess.

Funds needed for University Education in Wales.

	A. For Buildings and equipment.	B. For endowment.
University College, Aberystwyth	99,800	£1,071,500
University College, Bangor ...	176,500	960,400
University College, Cardiff ...	162,000	1,176,400
The University of Wales ...	—	288,400
Totals	£438,300	£3,496,700
Grand total		£3,935,000

In round figures, therefore, we may say that university education in Wales needs an endowment of four millions sterling to secure its efficiency. This will not be thought an extravagant figure when it is remembered that the need of the Birmingham University was estimated at five millions, and that the Welsh colleges minister to the needs of a far more diverse population. The agriculture, the manufactures, the mining and the over-sea commerce of Wales all demand the enlightenment and intelligence which can only be developed in universities efficiently equipped for their work.

FORMOSA.

The Island of Formosa. By James W. Davidson, Consul of the United States for Formosa. Pp. 646+xxviii+46. (London and New York: Macmillan and Co., Ltd., 1903.) Price 25s. net.

CONSUL DAVIDSON'S work on Formosa is a heavy quarto volume of 700 pages, in which the liberal use of small type indicates that its author has tried to pack as much as possible within a given space.

It is not a lap book, but a book for the study table, in which 168 photographs and other pictures give of themselves a liberal education about things Formosan. A coloured frontispiece shows Mount Morrison capped with snow, 13,880 feet in height. This, which is one of the many peaks in the mountain ranges which form the backbone of Formosa, is the highest mountain in the Japanese Empire. Another illustration is that of sea cliffs on the eastern coast. These, which attain heights of 5000 to 6000 feet, are possibly the highest sea cliffs in the world. Orographic features with these magnitudes in an island about half the size of Scotland are certainly remarkable. From other pictures, in which are depicted generals, battles, dismantled forts, Chinese temples, the surrender of the Dutch to Koxinga, the torturing of Dutch by the Chinese, Japanese streets, tea houses and barracks, a Christian church, a police station, a meteorological observatory and railways, it may be inferred that, politically and socially, Formosa has had a chequered history.

The Chinese, who have known Formosa since A.D. 608, tell us that it was created by certain fierce dragons which glided out from the gates of Foochow, and

lashed up the bed of the ocean until Formosa was created. The origin of this may rest on the fact that Formosa has, at least in part, resulted from volcanic activity, and in the Eastern mind such activities and dragons were in past ages closely associated. In the early Middle Ages the harbours of this island, which are almost entirely confined to its western shores, were used as clearing houses for trade between China and Japan, and also as homes for pirates. One princely freebooter who settled and married in Japan started life as a Chinese tailor. Before he died, by raids and intrigues he commanded 3000 sail, and was so powerful that he could not be opposed even by the Emperor of vast Cathay. He became a Christian, and was christened Nicholas. His son, Koxinga, born in Japan, was more powerful than his father, and remains one of the most remarkable characters in Eastern history. In 1662 he drove the Dutch (who had supplanted the Chinese) from Formosa, established a court, promoted industries, enacted wise laws, and ruled a nation of exiles and outlaws. China was helpless against him, and but for his sudden death it seems likely that he would have driven the Spanish from the Philippines. His grandson, a weakling, allowed the "Beautiful Isle" to fall back under Chinese mismanagement, and had these original owners only taken steps to award punishment for massacres and murders of shipwrecked crews, chiefly of foreign nations, Formosa might possibly have remained part of the Celestial Empire until the present day.

In 1874, in consequence of an outrage committed on the crew of a Loochooan vessel, Japan undertook a punitive expedition against Formosan outlaws. This was the thin end of a wedge which, after the war of 1895, was driven home, and Formosa was added to the Japanese Empire. It is, however, yet far from being completely under Japanese jurisdiction. The mountainous and densely wooded centre and eastern parts of the island still safely shelter head-hunting savages, whilst the borderland of these pathless jungles is a home for outlaws, and it is particularly against the latter that the Japanese seem helpless. The difficulty is to find them. At night villages may be looted by a howling mob, but next morning the sun rises upon smiling agriculturists.

After describing the tea industry, we are entertained with a long account relating to camphor. The camphor trees are, unfortunately, within the domains of the Aborigines, with the result that the camphor industry, head-hunting and butchery still go hand in hand. The chief victims appear to be the Chinese, the Japanese being but rarely attacked. Other industries are those of sugar and the mining of coal and gold. When speaking of the sulphur deposits, which are associated with geysers and a variety of spiteful volcanic vents, Mr. Davidson tells us that, in order to prevent certain insurgents obtaining material for the manufacture of gunpowder, an Imperial edict arrived from Pekin ordering officials to destroy all sulphur deposits by fire, and to stop up all offending craterlets which produced this substance. Altogether eighty-eight volcanic orifices were discovered, on which for several years officials paid quarterly calls, and with

perseverance, hope, and clods endeavoured to stop their roarings. This was in 1833.

Long lists and descriptions are given of various plants having an economic value, amongst which we note indigo and other dye plants, fibre plants, paper plants, oil plants, tobacco, coffee, &c., together with some account of forest trees.

The description of the savages is derived from the work of Mr. Y. Ino, who devoted several years to their study. Eight groups are referred to, and for each of these an account is given of their dwellings, dress, ornaments, food, diseases, head-hunting, language, and generally on subjects of anthropological interest. All we have bearing upon zoology is a list of land birds by J. D. de la Touche, and a list of mammalia by the late Mr. Robert Swinoe, the latter, unfortunately, only bringing us up to 1872. Meteorology and seismology are referred to in a short appendix, but about geology Mr. Davidson is practically silent.

With this and a few other exceptions the work is encyclopædic in its character, and it may well be recommended to commercial and scientific men who search for information about the island of Formosa.

THE BASIS OF PLANT-SURGERY.

Pathologische Pflanzenanatomie. By Dr. Ernst Küster. Pp. 300, and index. (Jena: G. Fischer, 1903.) Price 8 marks.

THAT plants have their diseases is a truth that has forced itself more and more on this colonial empire of ours, and that the signs of disease frequently express themselves in abnormal structures and out-growths is well known to those few experts who have to deal with the galls, cankers, pustules, tumours, and other "malignant" tissue-formations, the very names of which remind us of the ills to which flesh is heir.

Moreover, there is a surgery of plants, as well as of animals, and the true basis of this growing art is in both cases a thorough understanding of the pathological, or diseased, as well as of the normal or healthy anatomy of the patient.

This scientific basis of a refined art is the subject of the work before us.

The author of this treatise had already distinguished himself in München by his work on the anatomy of galls, and it is with the greatest satisfaction that we find him inaugurating his career at Halle by a thorough exploration of what is to a large extent a practically new theme, and one, moreover, so worthy of the traditions of his present post, for it is remarkable that, while we have several modern books on physiological anatomy and on the pathology of plants, no competent botanist has given us a detailed and comprehensive treatise on this now important and rapidly extending subject.

Küster's book consists of 300 pp. of excellent and clearly-written matter, illustrated by 121 figures not always worthy of his text, though never obscure or irrelevant.

He divides his subject into six chapters, of which

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five are devoted to technical and special descriptive anatomy as modified from the normal by pathological changes in the life-work of the tissues and cells, while the sixth is told off to do duty as a general account of the pathological processes themselves, and of what little theory we as yet possess on the subject.

Much as we admire the collection of anatomical facts, and the descriptions of morbid anatomy in special cases, comprised in these first five chapters, it must be evident that the subdivisions are somewhat unfortunate. The author himself apparently sees this, as is evinced by the uncertainty as to which heading certain cases shall be placed under, and we believe that the shortcomings are partly due to a somewhat slavish following of the terminology of the animal pathologists.

These headings are:—I. *Restitution*, under which are placed cases in which changes in growth, induced by sections and wounds, lead to the new formation of the cut-off parts, or to proliferations of various kinds.

II. *Hypoplasie*, or arrested development of organs or parts due to various inhibiting reactions, which bring about diminutions in the number or sizes of cells, or otherwise change the tissues so that they stop short of a stage of development which would normally be regarded as complete.

III. *Metaplasie*, or progressive changes due to over-stimulations which result in the cells and tissues undergoing structural changes in excess of the normal, though not suffering the enlargements or increase in numbers dealt with under the next and the fifth heading.

IV. *Hypertrophie*, where the cells attain dimensions more or less inordinate, and due to excessive growth while young and turgid. Most galls—in the widest sense—afford examples of these cases, which are extremely common.

V. *Hyperplasie*, or those abnormalities—usually enlargements and distortions—which owe their origin to inordinate increase in the average numbers of cells.

It is, of course, impossible to discuss examples of these various cases of abnormal anatomy here, and we have already expressed our satisfaction with the general subject-matter. We may note in passing that while Miss Dale's beautiful work on "Intumescences" is properly acknowledged, and one of her excellent illustrations suitably used on p. 86, the best results of her ingenious experiments on the kind of light which induces these abnormalities are not adequately given or apparently apprehended in the summary on p. 87.

To most readers, however, it will be the subject-matter of chapter vi. which will prove most attractive, though there is disappointment in store for anyone who expects anything beyond the most sketchy survey of the factors concerned in aetiology and development and their bearing on pathology. The sections on stimuli and reactions seem to us particularly weak, and the conclusion that any tissue can give rise to any tissue element—"aus jedem Gewebe kann alles werden"—may appear too lightly arrived at unless the reader is acquainted with the somewhat voluminous literature. The same, perhaps, applies to Küster's conclusion that tissue-elements quite foreign to the